Soil Conservation

January 1978

U.S. Department of Agriculture

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From the Administrator

Research Is Everybody's Business

Research is essential to expand our understanding of soil, water, and crop management. But conservation research is not the exclusive province of the scientist; it also requires the involvement of farmers and ranchers and professional conservationists.

There are three important ways in which everyone can participate in research. First, we can help identify research needs . . . tell scientists what is required most urgently in the field. SCS has special committees in each State office, in the technical service centers, and in the Washington office to review suggestions for research and to recommend projects. Many of these recommendations are passed along to the Agricultural Research Service, Economic Research Service, Forest Service, and other agencies.

Second, all of us need to work harder at digging out research results and in getting them applied. Scientific journals, farm magazines, and USDA and university publications all report on soil and water research. If a report sounds promising, we should ask the sources mentioned in the article for more information.

By staying alert to usable research findings, field people also can reduce the lag between a discovery and its application. More than a century elapsed between basic discoveries about the nature of electricity and the invention of the light bulb. Development of the transistorized radio, however, lagged only 4 years behind the invention of the transistor. Lag time is getting shorter; our efforts can make it shorter still.

SCS and district people also need to take an active part in local cooperative research projects and trials. Such projects offer an excellent chance to contribute practical knowledge about conservation and to learn from other disciplines.

Third, we need to remember that not all important discoveries and inventions are made by research scientists. In Vietnam, for example, there is a fall festival honoring a peasant woman named Ba Heng who discovered 300 years ago that her rice grew better if she planted the floating water fern Azolla in the paddies. Today, scientists understand that Azolla and blue-green algae work symbiotically to "fix" nitrogen so that other plants can use it. Farmers continue to make valuable observations and come up with ingenious inventions.

These three activities—communicating needs to scientists, helping apply research findings promptly, and staying alert to new discoveries at home—are effective ways for district leaders and SCS field people to participate in conservation research.

Mel Davis

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Cover:
Iowa farmers, who produce about one-fifth of the U.S. corn crop, are becoming more and more interested in soil and water conservation. (See pages 7 through 11.)

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by Claude D. Crowley

Researchers at the USDA Sedimentation Laboratory have come up with some surprising results in their studies on erosion and water pollution.

Research for Resources

L. D. Meyer, leader of the Erosion Research Unit, adjusts controls of the rain simulator for an indoor experiment.

Charter of the USDA Sedimentation Laboratory

The USDA Sedimentation Laboratory seeks solutions to erosion and sedimentation problems of our country with emphasis on those associated with the agricultural use of lands.

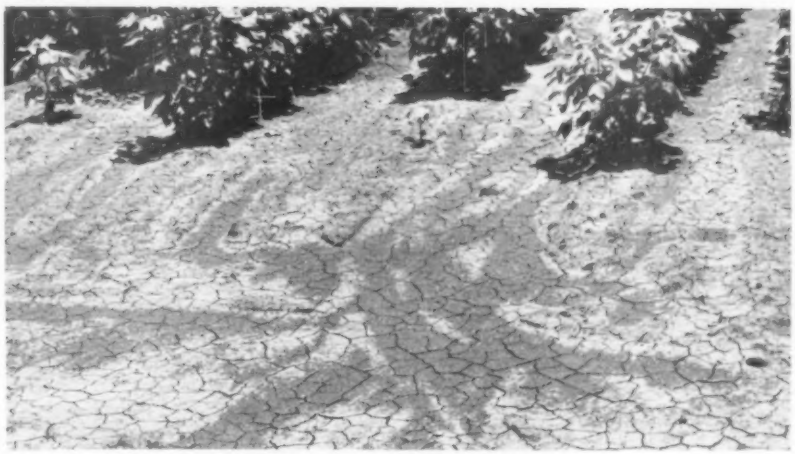
These problems involve the mechanics of soil erosion; sediment transport capacity; sediment deposition in stream channels, on flood plains, and in reservoirs; stream channel stability; the chemical, physical, and biological characteristics of the complex of water and sediments on streams and impoundments; and hydrology.

Of major importance is the concept of sediment as a pollutant and as a carrier of pollutants including agricultural chemicals.

The mission is to seek, through research, better methods, practices, and techniques for evaluating and controlling sediment and the effects of sediment on environmental quality.

Equipment automatically records depth of flow and duration, and takes samples of sediment-laden water. Agricultural Engineer Carl Murphree examines equipment at a recording station.

Below left, Engineering Technician Jack D. Greer checks equipment that records runoff and soil loss from an experimental plot of clean-cultivated corn. The device automatically takes samples and stores them for later analysis. Below right, surface runoff transports sediment to the ends of rows. Sediment is eventually deposited in ditches and streams.



An indoor experiment is conducted with a rain simulator. The muddy runoff water is collected in the bucket for later analysis.

Coming up with new information that runs counter to "commonsense" beliefs about soil and water is practically an everyday occurrence at the U.S. Department of Agriculture's Sedimentation Laboratory.

Among other things, Agricultural Research Service (ARS) scientists at the Oxford, Miss., lab have discovered the following:

- Much of our Class I, level cropland, once considered to suffer very little erosion, actually loses topsoil at an alarming rate.

- Visible rill or gully erosion may be a less serious polluter of water than "invisible" soil erosion.

- Cool, clear water may be a contradiction in terms. Other things being equal, muddy water stays cooler than clear water.

- A side effect of atmospheric nuclear bomb tests is being used to study erosion and sedimentation.

The laboratory's director, Donn G. DeCoursey, reported that "contrary to what we formerly believed, the soil loss from much of our Class I, clean-cultivated land may be above tolerable limits."

Studies on the Mississippi Delta for 4 years revealed that soil losses may average more than 7 tons per acre per year, with 13 tons the highest annual loss reported.

DeCoursey's staff is following up with intensive research to find out which soil properties affect erosion on level or near-level land.

In seeking answers to problems, the Mississippi researchers work closely with personnel of the Soil Conservation Service, Forest Service, Corps of Engineers, State experiment stations, and other ARS facilities.

Research into so-called invisible erosion is a project of L. D. Meyer, head of the lab's Erosion Research Unit.

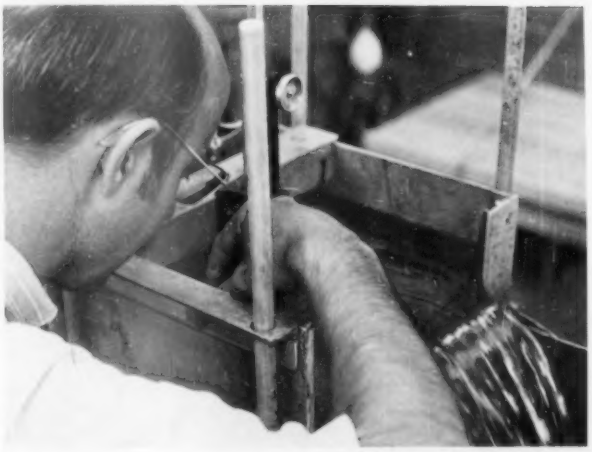
"The right name for it is *interrill* erosion," Meyer explained.

Interrill erosion, according to the scientist, is different from sheet erosion. Sheet erosion can include rills or miniature gullies which can be "rubbed out" each year by tillage equipment.

"Interrill erosion takes place on the surface, literally between rills," Meyer explained. "Visible rills and gullies get larger as they proceed down a slope, but inconspicuous interrill erosion is uniformly damaging all over the slope." Interrill erosion is caused chiefly by the impact of raindrops.

Meyer and his staff suspect that interrill erosion is an important cause of soil loss on near-level land. They are also concerned because chemicals that have settled on the surface may be carried into waterways along with

Below left, Calvin K. Mutchler (left), ARS researcher, and Jack D. Greer, engineering technician, discuss the quality of a test plot of minimum-tillage corn at the North Mississippi Branch Experiment Station at Holly Springs. Below right, J. B. Murphey, geologist, works with experimental flume which is carried to field locations to test erodibility of soil.



the soil material from interrill erosion. Oxford researchers can already cite strong evidence that farm chemical yields in runoff water are closely associated with sediment yields.

A 1975 study showed that 93 percent of the yields of toxaphene, a pesticide, were associated with the sediments in runoff, according to L. L. McDowell, research leader. Only 7 percent of the yields, he found, were transported in solution.

Conclusion: erosion control practices are vital during the tillage period not only to reduce loss of topsoil but also to reduce the pollution of surface waters by sediments and farm chemicals.

The lab is just as concerned with when erosion occurs as how. In the Mississippi Delta, the storms that cause the worst erosion and sedimentation usually occur during late winter and spring, when soil moisture is high.

Research leader Cal Mutchler calls this "a fact of genuine significance." His investigation unit found that on the erodible upland brown loam soils of North Mississippi, about 70 percent of erosion from conventionally cultivated corn occurs during April, May, and June. A field with a slope of 5 percent will lose between 9 and 13 tons per acre per year, most of it during the spring.

But Mutchler found that no-till practices, which provide cover during the spring, result in losses of only 0.3 tons per acre.

"You can see the tremendous potential for reducing erosion by applying conservation tillage practices during this relatively short period every year," the researcher pointed out.

Research into sediment is focused on small particles. Scientists have found that large aggregates, sand, and gravel are predictable; when the velocity of sediment-laden water slows, large particles drop out.

But colloidal material, less than .002 mm in size, can stay in solution from 6 months to 2 years.

"In other words," according to Director DeCoursey, "a lake in an area of fine colloids may stay muddy all the time. But there's so much we don't know. How much of the sediment finally settles out in the lake? How much passes downstream with spillway overflow? How much pollution is linked to the small soil particles? We need research to find the answers."

And what about muddy water staying cooler than clear water? Frank R. Schiebe, a hydraulic engineer, admitted that "the idea runs counter to the old cowboy song."

But Schiebe and his associates found that a clear lake is penetrated by the sunlight and stores energy. On the other hand, sunlight does not penetrate the surface of a muddy lake. It is reflected, and the water stays cooler. The engineers speculate that the difference in the water temperature of a clear lake and a muddy lake could be used to make a kind of heat pump powered by solar energy.

It is difficult to believe that any good has come from radioactive fallout, but one result of nuclear bomb tests is being used at the Oxford lab to help measure sediment accumulations.

Each atmospheric bomb test, according to researcher J. R. McHenry, inadvertently tagged soil with Cesium–137, a radioactive tracer. Since Cesium–137 fallout is attached to small soil particles, layers of the isotope in core samples from lake beds give scientists a fairly accurate estimate of sedimentation rates. It is also possible to trace sources of the sediment in the watershed.

Changes in agriculture keep the Sedimentation Laboratory busy. According to Director DeCoursey, new tillage equipment, new chemicals, new crops, and economic changes force researchers to search for new answers to problems of erosion, transport, and deposition of sediment.

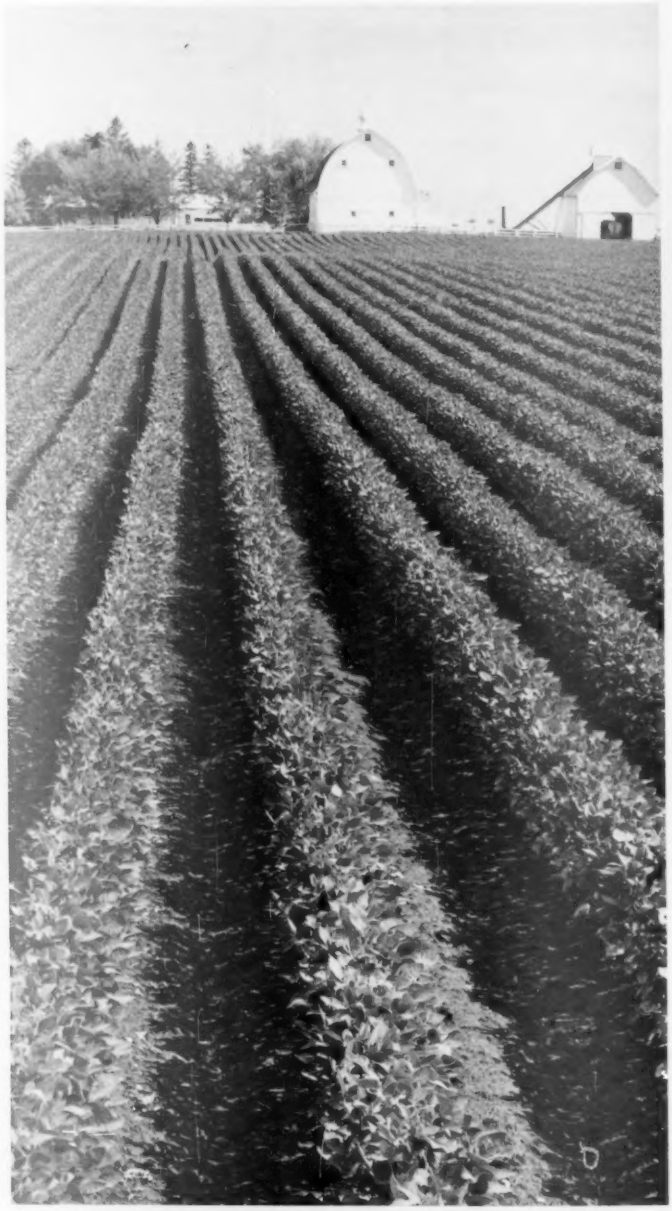
Mr. Crowley is head, information staff, South Technical Service Center, SCS, Fort Worth, Tex.

Iowa, with its high-producing farmland, has a big need for soil and water conservation measures.

by William J. Brune

Conservation Where the Tall Corn Grows

Iowa produces about one-fifth of the Nation's corn crop, more than one-fifth of the pork supply, and one-seventh of the grain-fed beef.



About half of Iowa is prime farmland, and an increasing acreage of this good, flat land has been planted in soybeans in recent years. Wind erosion is a problem on such fields, particularly in north-central Iowa.

On the Marlowe Feldman farm, corn is planted in an estimated 1,000 pounds per acre of soybean residue.

You won't find major professional sports teams in Iowa. Or surfing. Or subways.

What you will find is high-producing farmland, and a lot of it. It's the State's most valuable natural resource, and everyone from the Governor on down will tell you so.

Iowa's first governor, Ansel Briggs, who settled in our Maquoketa Valley in the 1830's, ran for office on the slogan: "No banks but soil banks, and they well tilled."

Iowa is landlocked; we're about as far from an ocean (1,200 miles) as any State in the Union. Our "Little Switzerland" hills in the northeast corner of the State are beautiful, but they are unlikely to inspire a songwriter to compose "Iowa Mountain High." We don't have 10,000 natural lakes, like one of our neighbors. Most of *our* lakes are manmade, to provide water for drinking, for livestock and irrigation, and for fire protection and recreation.

What we do have is a reputation as the place "where the tall corn grows." We produce about one-fifth of the Nation's corn crop. We also produce

Much of the rolling land in southern Iowa is better suited to pasture than row crops. Many farmers plant warm season natives, like switchgrass, that provide ample summer grazing and protect the soil.

more than one-fifth of the pork supply and one-seventh of the grain-fed beef. In all, with 95 percent of "the beautiful land" in agricultural use, Iowa produces 10 percent of America's food supply.

Our population is relatively small. Bordered on the east by the Mississippi River and on the west by the Missouri, Iowa's 36 million acres are home for fewer than 3 million people. That's half the population of Massachusetts, for example, in an area seven times as large. We still have room to stretch and breathe in Iowa.

While we're basically rural, we also have important industries. Iowa is either home base or boasts the largest factory for John Deere, Maytag, Amana, Quaker Oats, Lennox, Massey-Ferguson, and Winnebago, to name but a few. Most of our industries either process farm products or sell to farmers.

With this farm orientation, people here believe that agriculture and soil and water management are pretty important. The town businessman is just as interested as the farmer in the weather, prices, and yields. One-third of all Iowa workers, in fact, depend directly on agriculture for their jobs, and another 50 percent depend on it indirectly.

Iowa is well suited to growing corn and soybeans, but the soil needs to be protected with carefully planned conservation systems.

Weather is the most popular topic of conversation, and we have all kinds. Take 1977, for example. After the worst drought in central Iowa in 40 years early last summer, we had the wettest August on record around Des Moines.

Our close ties to the land may explain why Iowa was one of the first States with an erosion control law and the first State to appropriate cost-share funds for soil conservation practices. Iowa has made about $4 million available to landowners in each of the past 2 years. That's in addition to Federal funds. (But we could always use more.)

The funds are put to good use to protect our soil and water. Of Iowa's 36 million acres, 26 million are cropland, with more than 20 million acres in row crops. Some of that land is flat, but much is gently rolling, formed by the action of glaciers in four ice ages.

The soils of Iowa vary widely. Along both of the great rivers that border the State, soils form "sugar clay" loess hills; along the Missouri some are more than 100 feet deep. In north-central Iowa, which is relatively flat, the fertile prairie soils form the State's best corn country. In both northern corners, there are steep hills, and a large part of the land is in grass. In the south, bordering Missouri, soils were formed under grass and forests and are not as productive. Most are on slopes and are subject to severe erosion.

Iowa is well suited to growing corn and soybeans, but the soil needs to be

Today, Iowa's farmers are showing increasing interest in two conservation practices—conservation tillage and parallel terraces.

Vernon "Slewfoot" Hoffman is a conservation-minded farmer who has just built more than 1 mile of additional terraces on his big Iowa farm.

Our close ties with the land may explain why Iowa was one of the first States with an erosion control law.

protected with carefully planned conservation systems. Progress in fighting erosion has been steady, but much remains to be done. The Soil Conservation Service estimates that about 40 percent of Iowa's soils are adequately protected against erosion from water and wind. Coordinated private, local, State, and Federal efforts will be needed to finish the job.

Iowa needs more farmers with the positive attitude of Vernon "Slewfoot" Hoffman, a Buchanan County producer, who is undaunted by the cost of soil and water conservation measures on his $2,000 to $3,000 an acre farmland.

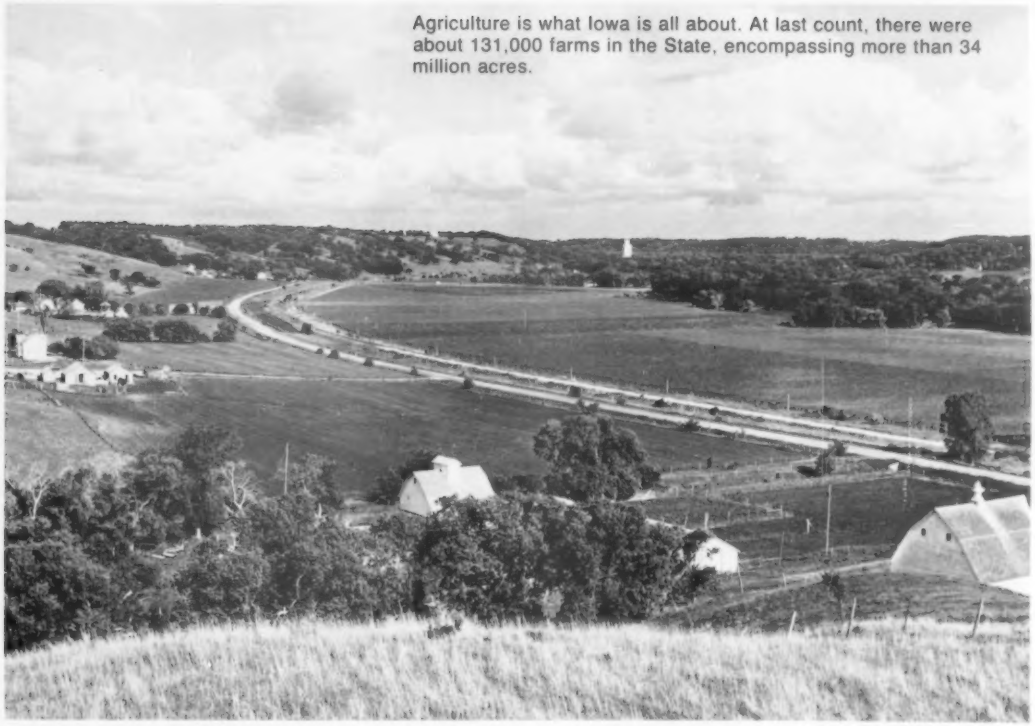
"I looked at my crops the other day and then told the bankers they'd better get their land tiled if they want a better crop next year," said Hoffman. He had just completed 6,000 feet of terraces on his sloping cropland, commenting: "I don't know exactly how these terraces work, but I do know that I can't afford to let this high-priced soil wash away."

Technical help for farmers like Slewfoot Hoffman is provided through 100 soil conservation districts—one in each of our 99 counties and two in Pottawattamie County. SCS has a field office in each, typically with a district conservationist and a technician. The State Department of Soil Conservation hires a clerk for each office, as well as a conservation aide in some. We really work as a team here in Iowa!

The three or four people in each office serve an average of 1,300 landowners, as well as other members of the public. So far, about half the farmers have conservation plans; the other half don't. But the number with plans and adequate measures installed is growing year by year. We'd like the number to grow faster!

The fact that we have so much cropland in Iowa—more than 18 other States combined—accounts for our big need for soil and water conservation measures. We estimate that the average annual soil loss for sloping cropland in the State is 13 tons per acre. That's more than twice what it ought to be. During the heavy spring rains of 1974—a truly disastrous season—soil losses of 40 to 50 tons per acre were not uncommon. (Those rains, by the way, were followed by an unprecedented season of terrace-building. It's unfortunate that it takes such a hard lesson to teach some people the value of conservation.)

Today, Iowa's farmers are showing increasing interest in two conservation practices—conservation tillage, including no-till, and parallel terraces with tile drainage. More than 7 million acres of row crops are now grown under some kind of reduced tillage, although we're still arguing for more residue on some soil surfaces. About 2,000 miles of terraces were built in 1976, bringing Iowa's total to 60,000. But many more miles are needed before our soils receive adequate protection.



Agriculture is what Iowa is all about. At last count, there were about 131,000 farms in the State, encompassing more than 34 million acres.

The installation of tile drains in conjunction with terraces was promoted in the early sixties by an SCS engineer in Iowa. It was his answer to the problem of too much water trapped in terrace channels after heavy rains, particularly in poorly drained soils. What that engineer fought to have accepted a few years ago has since been widely adopted throughout the Service.

The increase in soybean acreage is putting new demands on conservationists. SCS and the soil conservation districts have helped Iowa farmers protect about 5 million acres in the past 16 years. In the same period, however, soybean acreage also increased by 5 million acres, replacing small grains, grass, or rotation crops. This change means we have to take another look at these 5 million "new" cropland acres to see if additional protective measures are needed.

But while we worry a lot about present and future needs, we are proud of past conservation accomplishments. We have 96 small watershed projects, with about one-fourth of them completed. Also in Iowa is the highly successful Little Sioux River Watershed Project, one of the 11 flood control projects authorized in 1944. More than 460 ponds and lakes and 6,200 miles of terraces are located in that project area alone.

One-third of all Iowa workers depend directly on agriculture for their jobs, and another 50 percent depend on it indirectly.

Soils have been mapped in half the State's counties, and we're trying hard to complete four more counties a year in the cooperative soil survey program. Our goal is to have all Iowa mapped by 1986.

Four resource conservation and development areas are authorized and are experiencing success in solving local problems. Two other areas are organized and waiting.

In a nutshell, that's the story of conservation in Iowa. We've done a lot of work, but we still have much to do. We have confidence in the commonsense of Iowa farmers when it comes to taking good care of their valuable farmland. We believe that more of them each year are going to get behind soil and water conservation.

The people of Iowa also are optimistic. Where else would you find promoters holding "the world's largest hog race?" Where else would you find a young man selling T-shirts and posters inviting visitors to "Ski Iowa," showing nothing but a snow-covered haystack? SCS and the district commissioners try to share that optimism and look upon the job ahead, not as a trial, but as a challenge.

Mr. Brune is State conservationist, SCS, Des Moines, Iowa.

Sediment Ponds Turn into Freshwater Marshes

by C. Winstead Burdette
and Katherine C. Gugulis

When nature transformed temporary sediment basins into marshes which attracted wildlife, local residents' complaints about the structures turned into a movement to retain them.

No one in Columbia, Md., imagined that residents would one day circulate petitions aimed at saving six sediment basins once considered neighborhood irritants. But neither had townspeople counted on nature's transformation of the manmade ponds into freshwater marshes rich with wildlife.

When the sediment basins were installed behind new houses about 6 years ago, homeowners called the Howard Soil Conservation District (SCD) office to complain. "The first few summers we were deluged with complaints about mosquitoes from those unsightly 'mudholes'," recalled SCD Manager Robert Ziehm.

"But when the development company decided to remove the ponds this summer, some of the people who protested their installation called to protest their removal," Ziehm said.

Columbia, halfway between Baltimore and Washington, D.C., is a "new town" development that has received national recognition because of its unique planning for social and environmental needs.

Marge and Tony Lambros are two Columbia residents who have had a change of heart about the sediment basins. "They seemed pretty awful when they first went in," said Marge Lambros. "But now that they've 'matured,' we're reaping rewards from all the wildlife using the ponds."

The wildlife immigration began about 3 years ago with the arrival of a pair of mallard ducks. "Now they've been joined by green heron, egrets, wood ducks, and even a gadwall duck," she said. Other residents have seen a variety of songbirds as well as muskrats, water snakes, turtles, raccoons, opossums, and sandpipers.

"People spend millions of dollars every year on campers, equipment, and hotels so they can get back to nature and away from the pressures of urban life," said Tony Lambros. "All I have to do is sit in my own backyard to get the same thing."

The basins, designed to trap sediment contained in runoff, were installed during 1971 and 1972. They range from ½ to 1 acre and were designed to meet requirements of a 1970 State law—one of the first of its kind in the Nation—aimed at keeping sediment generated by construction out of streams. The Maryland Water Resources Administration provides leadership while county governments issue the necessary permits and enforce the program. Responsibility for approving a developer's sediment control plan is assigned to soil conservation districts, which obtain technical assistance from the Soil Conservation Service.

"The wildlife benefits from the sediment control program are certainly something we didn't envision," admitted SCD Manager Ziehm. "They've changed our whole outlook on sediment basins. We're thinking about changing specifications for this type of pond so that developers can choose to

Homeowner Marge Lambros points out a turtle sunning itself on a log to her children. The pond attracts a variety of wildlife including mallard ducks, egrets, muskrats, and sandpipers.

design and maintain them to remain permanently."

The primary reason for present plans to remove the sediment basins, explained Ziehm, is that "some may be structurally unsafe because they were designed for temporary water storage, rather than permanent ponds."

Under the State's "pond law," districts share responsibility for approving permits for small ponds. In reviewing pond plans, SCD's use standards and specifications developed by SCS. In their present state, the marshes do not meet structural safety requirements for permanent ponds.

"If we can determine that the structures are safe or could be made safe," Ziehm added, "we'd like to see them retained."

Recently, Ziehm and several SCS specialists visited the six ponds to see what repairs or modifications would have to be made. Based on SCS's recommendations, Ziehm says he is optimistic about the feasibility of upgrading most of the ponds. Improved piping systems and emergency spillways would be necessary to assure the integrity of the dams.

Aelred Geis, U.S. Fish and Wildlife Service biologist assigned to the Patuxent Research Center, is another who feels that the ponds should remain. "An important fringe benefit of the ponds in Columbia is their wildlife value," said Geis, an expert on the effects of urbanization on wildlife. "These sediment ponds have an amazing amount of bird use."

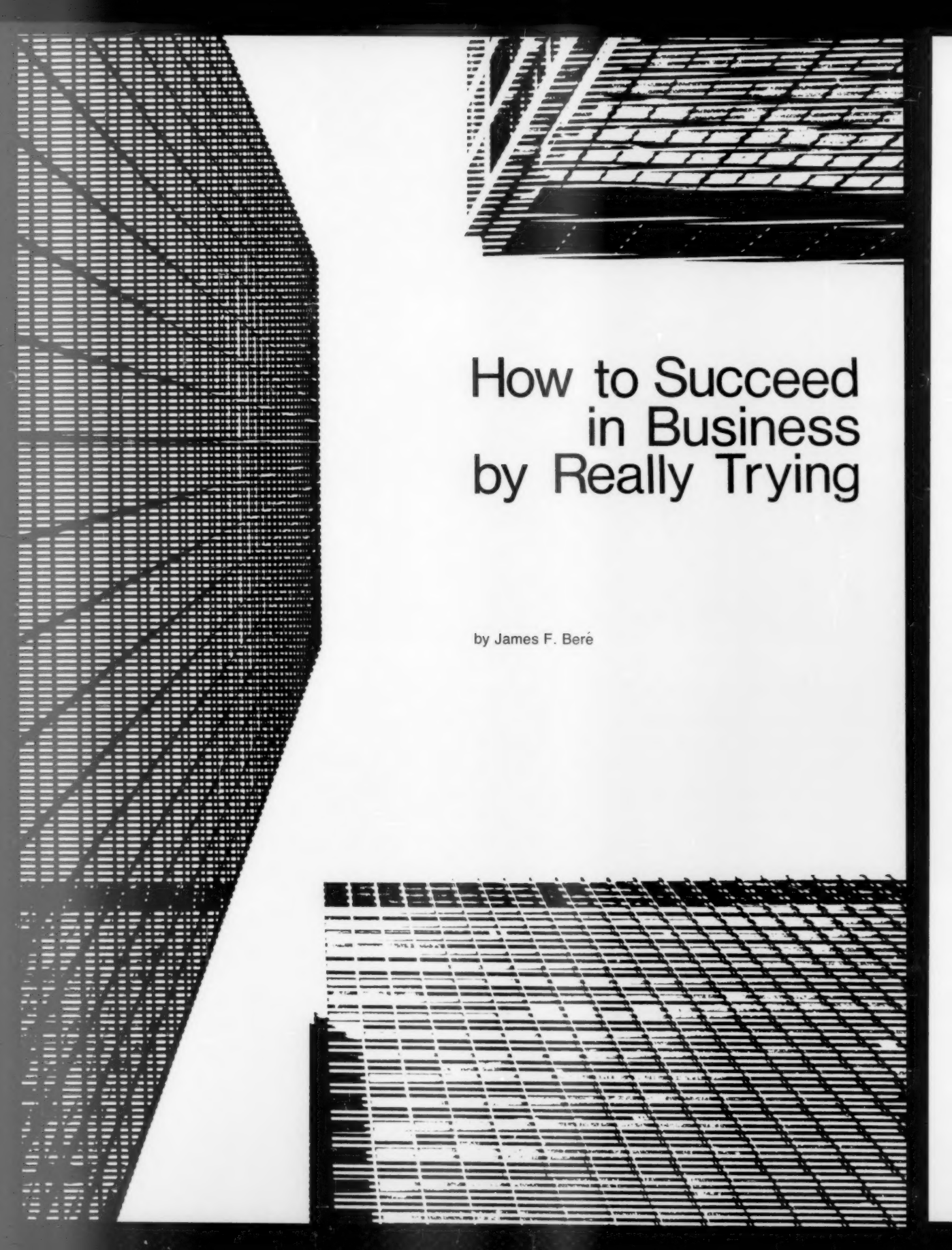
Over the past several years, Geis has monitored the wildlife use of open space areas in Columbia. Some of his sample plots coincided with the location of three of the sediment basins.

In 1975, Geis determined that Columbia's shallow sediment ponds were more than 300 times as likely to have ducks or other aquatic birds on them than were the deep water ponds he observed. The next year, after partial draining of one of the larger sediment ponds, the shallow ponds still were 80 times as likely to have use by aquatic birds.

The fact that these manmade marshes represent a type of habitat that is rare in Howard County accounts for their heavy use by wildlife, according to Geis. Columbia homeowners who have discussed the sediment basin matter with Geis have been "effervescent with enthusiasm in seeing animals that usually aren't found in urban areas," he said.

Besides their wildlife values, Geis said, the ponds continue to trap sediment and to store some storm runoff. And residents find that mosquitoes are no longer a problem because now there are enough natural predators to keep them in check.

Mr. Burdette is district conservationist, SCS, Ellicott City, Md.
Ms. Gugulis is public information officer, SCS, College Park, Md.



How to Succeed in Business by Really Trying

by James F. Beré

A successful executive cites the need for setting goals—not only for yourself, but for the organization you want to head some day. But, he says, enjoy your work as you go.

Men and women in the broad ranks of middle management are in the best of all possible spots today. Despite constraints on companies' growth, the very problems they face require increasing numbers of skilled managers. Opportunities for advancement are abundant—but not so the supply of people who can be advanced.

If you're in the ranks of the qualified, your chances of making it to the top could be better than ever.

The top, in this case, means not just the chief executive officer, but those score or more of top jobs in any company that have president in the title: senior vice-president, executive vice-president, group vice-president, or plain vice-president, not to mention treasurer, controller, and chief counsel.

If you're like most middle-managers, you have a good idea whether you have enough education or need that Master of Business Administration degree, if you should seek an overseas assignment, if you're compiling the record of achievement that demands a close look, if you match up against others of your age and experience. If you can complete that assessment and feel good about your chances, you probably have your sights set on a top job.

However, if your goal is to be a chief executive officer or one of those other top officers, concentration on that goal might be hurting your chances of making it. You'll be looking so far into the future you probably won't be focusing on your biggest opportunity: your present job.

Even worse, you'll be thinking so much about your career that you'll be missing the fun of getting there. Too many people, including those on the inside, think of business as so grim that they don't enjoy themselves.

Here, then, is some advice on how to succeed in business by really trying. And by enjoying yourself while you're at it.

Nothing mystical or revolutionary is involved in these suggestions. Instead, they're the do's and don'ts most successful managers learn to follow—by instinct, by experience, by advice.

The importance of these fundamentals escapes those who create and believe the "success without effort" theories. A recurring myth is that the key to success is to be a good politician. When I was a young manager in the 1950's, the theme of the book-musical-movie *How to Succeed in Business Without Really Trying* was a popular delusion. Another myth is that you can succeed by running over people, as witnessed by the recent book, *Winning Through Intimidation*. Both approaches are nonsense and appeal to people who don't have the ability and determination to succeed by doing their job well.

Some people who are office politicians or intimidators do succeed. However, they might do even better if they didn't direct their energies to scheming or steamrolling to get ahead.

If you're in the ranks of the qualified, your chances of making it to the top could be better than ever.

These suggestions also have a fringe benefit. If you're not serious about making it to the top, or if you are and don't, your career still should be more satisfying—and fun—if you follow some commonsense rules.

First, do your present job the best you can. As one of my business school professors used to say: "Do your job so that you know it better than anyone. Relate it to the goals of the total enterprise."

At the same time, enjoy your work by doing it well. As Peter Drucker put it, every management job ought to be rewarding and satisfying in itself, rather than just the means to the next job.

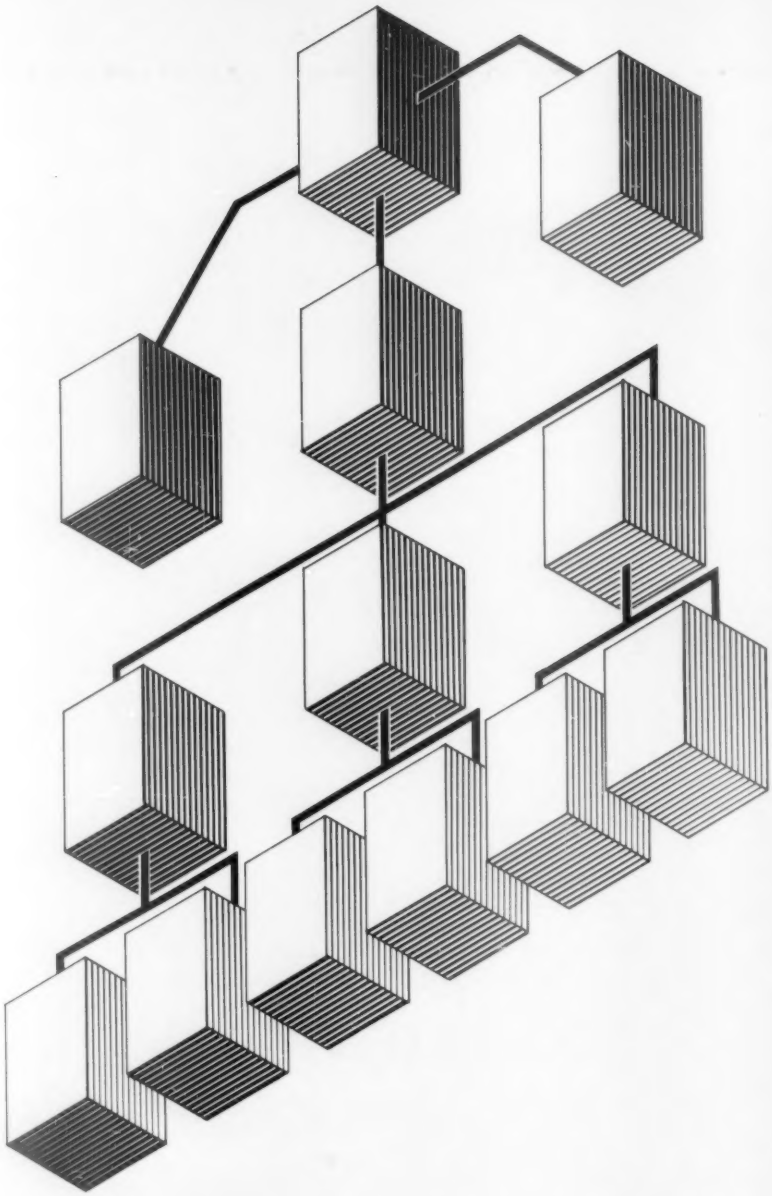
I found that trying to do my job better than anyone else gave me increasing satisfaction. In turn, as I enjoyed it—when the job really got to be fun—I'm sure I did it even better.

Then learn as much as possible about the next job. And do something many people overlook: train your successor.

Manage your time—it's difficult to do your job the best you can, and to enjoy yourself while you're at it, if you can't manage time. It's one of the most valuable skills anyone can have and you can't acquire it too early.

We all waste time, but most of us waste too much. One problem is distinguishing between what's important and unimportant.

Like most people, chief executive officers and others at the top tend to do what they want to do rather than what they ought. That, however, is a luxury no manager can afford. The demands



Every management job ought to be rewarding and satisfying in itself, rather than just the means to the next job.

on your time are enormous and there is only so much of it.

To help me manage my time, I use my secretary and other staff people. At intervals, I keep a log, a diary, of everything I do for one full week—everything, including meetings, phone calls, even coffee breaks. I study it to learn how time could be saved. What things shouldn't be on this list? Which could be combined? For example, I spoke with one person three times in one day; could one meeting have handled it?

A word of caution: most managers keep schedules and lists of "things to do" in the belief they can plan for everything. My predecessor as president told me: "Never plan your day so rigidly you can't deal with an unforeseen crisis." Some men I knew who failed were so inflexible they couldn't see their key people unless the matter was on the schedule for that day.

Get good information on what is happening. This relates to the budgeting of time—because it takes time—but it's important. The basic element for getting good information, of course, is the "nervous system" of any business: good, reliable financial controls. But they're not enough. If financial controls were the only input, business would be in trouble because those controls react mainly to the past, or at best, to the present.

Get out among the people running the business: talk to employees, customers, and suppliers. Most experienced managers can feel the difference between the climate of an organization with good morale and one with problems. You pick up the vibrations.

The higher up the ladder you go, the more important is the question of what to do with the information you collect. The rule here is, don't act precipitously, don't usurp the authority of subordinates. Don't stroke your ego because you like to see something tangible happen. It takes discipline not to overreact, but it's a habit that has its own reward. By the time all of the facts are in, you will find that the problem rarely is as one-sided as it first appeared.

Not acting precipitously is part of learning how to make timely decisions. Too many executives, anxious to

We all waste time, but most of us waste too much. Managing time is one of the most valuable skills anyone can have, and you can't acquire it too early.

manage aggressively, get trapped into thinking that they must act now or lose the opportunity.

If somebody tells me at 11:45 a.m. that we need a decision by noon, my instinct is to tell him to wait. The chances are that he's overreacting.

Be decisive; don't procrastinate. During the Civil War, one of Lincoln's commanders, General McClellan, kept telling the President he could strike if only he had more soldiers. When he got them, the weather wasn't right. Basically, McClellan didn't want to make a decision.

This lack of decisiveness, the inability to act when action is needed, is often a greater barrier to progress than the problem itself. You have to learn to use judgment, to find the middle ground between impulsive action and delaying a decision until you've passed the critical point.

It's important to read widely and well. I try to read in many areas: not just business literature, but history, philosophy, current events, classics. I read the biographies of great leaders, not to imitate them but to understand what makes people succeed.

Just as valuable as reading widely is experiencing widely. The best move I made after college was to work in the machine shop in my first job. I not only found out how things really are made, but I gained insights into the attitudes of hourly workers that I couldn't have gotten any other way. After that, I tried to work in as many other departments as possible so that I could understand how all of a company's operations fit together.

One "do" that is overlooked is to set personal objectives, not for yourself, but for the kind of company you someday want to head. The young manager who has a vision of the kind of company he or she wants to head will try to create that kind of company now. First a department, then a plant. Both the manager and the company will be the better for it.

You do all these things, and you make it to the top. Now what?

Most important, the job still should be satisfying most of the time. There isn't any such thing as total satisfaction from any job; we can't be happy at our work all the time. We all are human and we have our highs and lows. We have disappointments; we make mistakes; we create hurt when we don't want to. But if the satisfaction isn't there most of the time, then the job is wrong.

The chairman of a major corporation who retired a few years ago said he couldn't recall one day when some business problem wasn't worrying him, keeping him awake at night. That's the wrong job.

At the same time, you have to learn to accept the constraints of success. One young manager asked me: "Isn't it rewarding to have the freedom to do as you wish?"

"It doesn't work that way," I replied. "The greater your responsibility, the less freedom you have. You set the tone for the other managers, and sooner or later your management style filters down and influences your associates. It isn't that you're forced to act differently than you'd like, it's just that you're more conscious of the impact that your habits and attitudes have."

One of my greatest satisfactions is being a talent scout: finding and selecting people, helping train them, working with them, watching them grow. Perhaps the hardest lesson to learn, however, is don't try to be universally loved or admired. If that's your goal, you'll fail. You don't have to seek approval; it will come if it's deserved.

You should consider the welfare of your associates and employees as important as your own. Doing this won't guarantee success, but without this attitude, success will be hard to come by. Looking at your associates as people is critical if you are to develop the trust that's required for you, in turn, to exercise leadership.

To develop trust, you have to act in such a way that others will recognize that you're acting not in behalf of your personal interests, but in behalf of the organization and the welfare of others in the organization. The more mutual trust you can inspire, and the more openness you can create, the more freedom each manager will have to act without fear of being misunderstood.

Showing concern and developing trust is something you don't have to wait to do until you reach the top. Now is a good time.

Mr. Berè is chief executive officer, Borg-Warner Corporation, Chicago, Ill.

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Illustrations by Christopher Lozos

Most experienced managers can feel the difference between the climate of an organization with good morale and one with problems. You pick up the vibrations.

by Nancy M. Garlitz

Spraying a slurry of hydromulch and grass seed helped hold the soil at a newly constructed aquatic center.

Erosion Didn't Have a Chance

Frequent watering and applications of fertilizer helped establish substantial growth of the combination warm and cool season grasses in about 4 weeks. Solid sod strips were put across the drainageway where grass seed wouldn't have time to take hold.

From the looks of the Edmond Aquatic Center, the development of a new community park in Edmond, Okla., is off to a good start. City officials made sure ground cover was planted to prevent erosion on disturbed areas as soon as construction was completed on the first phase of the project—an Olympic size pool, separate diving well, and a bathhouse.

The soil at the pool site is fine sandy loam that erodes easily when disturbed, and erosion control was especially needed on areas that sloped away from the pool and the parking lot.

"We wanted to have the soil covered by winter," said Harry Francis, parks director for Edmond. "We knew we'd be in good shape next spring if we could establish at least a temporary cover of cool season and warm season grasses this fall."

A mixture of bermudagrass, bluegrass, ryegrass, and Kentucky 31 tall fescue seed was combined with hydromulch and water and sprayed onto the disturbed areas around the pool.

The hydromulch is fibrous material that holds the soil while the seed comes up. Applications of fertilizer and frequent watering helped establish substantial growth in about 4 weeks.

Solid sod strips were put across the drainageway where grass seed wouldn't have time to take hold.

The city of Edmond is also planning to build two shelters, restrooms, a concession stand, a small pond, and a trail system for bike riders and pedestrians. There will also be areas for nature study. A ballfield on land reclaimed from a sanitary landfill is already completed. Park facilities are planned to eventually cover about 90 acres.

The Soil Conservation Service provided soils information to park planners through the Planning Department of Edmond. SCS also assisted the Oklahoma County Conservation District with the "A-95" review for the aquatic center which is required by the Office of Management and Budget.

Thirty to 40 percent of the county is in urban development, and the A-95 review gives SCS an opportunity to insure that conservation measures are considered in land use planning for the many municipalities, according to Al Conradi, SCS district conservationist for Oklahoma County Conservation District.

The Bureau of Outdoor Recreation of the U.S. Department of the Interior provided cost-share assistance for purchasing land for the park through its land and water conservation program.

"One of our main objectives in planning the park was to leave as much land as possible in its natural condition and to preserve the native grasses and trees," Francis said.

This not only helps prevent erosion and sedimentation, but results in areas that are easier and less expensive to maintain. Francis says, "If we can't maintain it, we won't build it."

Al Conradi, SCS district conservationist for Oklahoma County Conservation District (right), Bill Dashner, city manager for Edmond (center), and Harry Francis, parks director (left) discuss how they "held the soil" at the newly constructed Edmond Aquatic Center.

Ms. Garlitz is a writer-editor, Information Division, SCS, Washington, D.C.

Don Glisson, SCS district conservationist, gives high school students a lesson in catfish management during the Field Day.

Diversified Farm Hosts Ecology Field Day

High school students in eastern North Carolina learn about agriculture and its relationship to resource management by visiting a conservation farm.

by Frank H. Jeter, Jr.

Biology teacher Martha Glisson wanted her students to learn more about soil and water conservation. She decided that a visit to an operating farm would give her students and others in Nash County, N.C., high schools some firsthand experiences with conservation.

Six years ago, Glisson met with representatives of the County Board of Education, the Nash County Commissioners, the Nash County Soil and Water Conservation District (SWCD), and the Soil Conservation Service to plan a program and establish goals for an Ecology Field Day.

Since Nash County is located on the fertile North Carolina Coastal Plain, the planning team decided that the major thrust of the annual Field Day should be to broaden the students' understanding of the interrelationships between agriculture and proper management of the area's natural resources. North Carolina's Forest Service, Wildlife Resources Commission, and Extension Service offered to help with instruction.

Glisson's husband, Don, who is SCS district conservationist in Nash County, contacted I. C. "Ike" Lamm, a cooperator with the Nash County SWCD, who agreed to hold the Field Day on his 1,000-acre farm.

During this year's Field Day, representatives of the cooperating agencies gave about 1,500 students detailed information about such varied topics as use of soil surveys, cropping systems, erosion control practices, woodland management and fire control, and the need for wildlife habitat and food sources.

Conservation plays an important part in Lamm's farming program. He has installed terraces and grassed waterways which collect and hold runoff water from storms. His cover crops, permanent pastures, and field borders lessen the impact of wind and water, keeping the soil in place. Lamm is particularly interested in controlling erosion because he wants to keep sediment out of ponds where he raises catfish for commercial markets. In addition to his commercial catfish operation, he raises cattle, grows tobacco, harvests sawtimber, and manages ponds for catfish, bass, and bream fishing.

The diversified farming operation and the variety of conservation practices make the Lamm farm an ideal place to teach soil and water conservation.

Mr. Jeter is public information officer, SCS, Raleigh, N.C.

by Rose C. Fleming

Wealth of Water

In Mississippi, farm ponds are used for a variety of activities, from fishing for fun and profit to irrigation and fire protection.

If everybody in Mississippi wanted to go fishing twice a year, Mississippi's farm ponds could accommodate them, provided the landowners were willing. And many are.

There's a wealth of water in Mississippi's farm ponds. More than 224,000 surface acres are in the 132,277 ponds that dot the landscape from Pascagoula to Horn Lake.

These privately owned ponds provide water for cattle, for irrigating gardens, and for fire protection. They also brighten the leisure hours of thousands of farm families.

The farm pond is one of Mississippi's earliest conservation practices. The Soil Conservation Service has been assisting landowners in locating, designing, staking out, and managing ponds ever since the agency was established in the early 1930's. Working through soil and water conservation districts, SCS provides technical help to Mississippi cooperators on the nearly 1,500 new ponds they build each year.

In 1976, SCS assisted 6,510 cooperators seeking information on pond management. SCS biologists test water quality, check fish populations, and advise on stocking rates and weed control.

There is a constant demand for fingerlings for stocking new ponds and restocking old ones. Most ponds are stocked with bass and bream which the Mississippi Game and Fish Commission helps deliver from the U.S. Fish and Wildlife Service hatcheries near Tupelo and Meridian.

Ponds especially designed and managed for catfish have created a whole new industry. From some 16,000 acres in fish production, Mississippi farmers harvest about 40 million pounds of catfish each year. Most of the State's catfish ponds have been designed and built with technical assistance from SCS.

Attracting wildlife is an added benefit of farm ponds. Some landowners put up nesting boxes for wood ducks along the banks of tree-lined ponds. The ponds also provide food and water for raccoons, squirrels, and quail and other birds who tend to make their homes nearby.

Irrigation is another, though not common, use of Mississippi's ponds. A good example is the W. W. Williamson farm west of McComb, where Williamson uses pond water to irrigate the gladioli he grows for commercial markets.

Debris basins, which are mainly used to trap silt from eroded areas, are constructed in many Mississippi counties. But where landowners are able to solve their erosion problem, these basins can make beautiful ponds.

Yes, there's a wealth of water in Mississippi's ponds. They are a priceless water resource created by conservation farmers.

Ms. Fleming is public information officer, SCS, Jackson, Miss.

Hobby Leads to Model Woodland

by Ernest A. Christie

Through their interest in conservation, a Kansas family has a model woodland to supply their woodworking hobby.

Five years ago it was a 17-acre patch of wasteland brush and scrub. Now it's a thriving walnut and wild cherry-orchard.

The combination of a family's woodworking and conservation interests made the difference. Robert and Sue Dubois, who farm 2,000 acres near Burlingame, Kans., purchased the woodland tract to produce material for their hobby of handcrafting furniture and other home accessories.

Robert Dubois said he felt the land had good potential, but that few others would have agreed. It was crowded with low-market-value trees and was so overgrown with brush that he had to bulldoze several trails before he could begin management improvements.

A Cooperative Extension Service forestry specialist helped him develop a timber improvement plan that he is carrying out with cost-share assistance from the Agricultural Stabilization and Conservation Service.

Dubois removed the undesirable trees and saved a number of existing walnut, wild cherry, and hackberry trees. Then, he began pruning the walnut trees to develop better logs.

Dubois also planted walnut seedlings along creeks and established an orchard of other types of nut trees. The Soil Conservation Service, through the Osage County Conservation District, provided soils information and helped select planting sites.

During the past 5 years, the Dubois family has harvested about 2,000 board feet of walnut and about 1,500 board feet of cherry lumber. Much of the harvest goes into production of an array of home accessories including plaques, bed headboards and footboards, tables, children's furniture, and cabinets.

"Although we have sold some walnut for fireplace mantels and have traded some wood stock, we consider our woodcrafting primarily as a relaxing hobby," Dubois said.

Dubois takes care to harvest only mature or damaged trees—for management considerations as well as esthetic reasons. "I particularly like to use stumps and forked branches, which a commercial logger can't afford to save, since they make the most attractive furniture," he said.

In 1974, the American Tree Farm System recognized Dubois as the Kansas Tree Farmer of the Year.

"Over the years, our woodland efforts have become part of our overall farming operation," Dubois noted. "Our conservation plan covers both woodland and cropland, and we're able to handle our timber stand work in the winter when we're not busy in the fields."

Mr. Christie was district conservationist, SCS, Osage City, Kans., and is now retired.

Robert Dubois grafts an improved nut variety on parent stock. Dubois and his wife, Sue, manage their woodland to provide a source of material for their hobby—handcrafting furniture and other home accessories.

News Briefs

How Grassland Management Affects Range

Scientists at Oklahoma State University will study the effect of grassland management on range condition, runoff, and water quality under a cooperative agreement with the U.S. Department of Agriculture (USDA).

With up to $30,000 provided by USDA's Agricultural Research Service, university scientists will conduct a 2-year study to determine the effects of vegetation and soil management on range condition.

The scientists will observe closely the vigor of different species of vegetation as well as turf composition.

Results from the research may be applied to infertile areas of sloping grassland to help make the soil more productive and may also help the environment by improving erosion control.

Air Force Base Wins Conservation Award

Griffiss Air Force Base, in Rome, N.Y., won the 1976 Secretary of Defense Natural Resources Conservation Award.

The award is presented annually to the military installation in the United States that has made the most progress, over a 3-year period, in applying resource conservation measures to the land. Competition for the 1976 award was restricted to installations of 5,000 acres or less.

At Griffiss Air Force Base, land managed for fish and wildlife was increased by 750 acres, more than 4,000 square yards of paved areas were converted to natural plantings, 228,000 seedlings were planted on 240 acres, and a wildlife refuge was developed on land reclaimed from a sanitary landfill.

The Soil Conservation Service provided technical assistance to the planners, the engineer, and the landscape architect on the base through the New Hartford field office.

Mine-land Reclamation Research Grants Awarded

Land-grant universities in 13 States will share almost $800,000 of Federal grant funds for research in mine-land reclamation.

The grants are being made by the Cooperative State Research Service, U.S. Department of Agriculture. The money was made available from the Environmental Protection Agency through an interagency agreement.

Scientists in the Northeast will study "orphan-land" reclamation, sulphur-related problems, hardwood seedlings, and mine-soil property variations. In the North Central States, they will study short-term weathering effects, crop rotations, alder use, deep tillage, the use of remote sensing, and soil profile characteristics in relation to mine-land reclamation.

Researchers in the South plan to study acid-forming minerals, adapted mycorrhizal fungi, and direct seeding of commercial forest trees. In the West, scientists will research sodium hazards, species adapted to disturbed areas, cultural practices for vegetation, water harvesting on saline media, mine-soil resources, the effects of topsoil depth, and the use of legumes for revegetation.

The universities involved are: West Virginia, University of Maryland, Pennsylvania State University, Texas A&M University, University of Kentucky, Purdue University, Iowa State University, University of Alaska, University of Missouri, Colorado State University, Montana State University, Utah State University, and New Mexico University.

Assessing Soil Fertility

A new method of measuring and assessing a soil's fertilizer needs by simulating the rate of flow of phosphorus and potassium ions through the soil and into plant roots has been devised.

Results from the new method compare favorably with traditional chemical tests for soil fertility without the usual risk of undue chemical alteration of the soil. It is expected that by using the new method, four or five soils could be completely analyzed daily. Current chemical tests provide only partial analysis of a soil; several separate tests must be run to obtain a complete analysis.

It is now generally accepted by agronomists that the diffusive rate (rather than solution flow) at which nutrient ions such as phosphorus and potassium move to a plant's root zone determines a plant's uptake of these nutrients which, in turn, determines how well the plant grows.

The diffusive rate of these nutrient ions depends on soil fertility. By measuring this rate, USDA Agricultural Research Service scientists have developed a simple method to characterize the soil's fertility.

The measuring is done with two soil-resin cells that simulate chemical conditions in the root zone of the soil. An untreated soil is used in one cell while in the other cell the same soil fertilized only with phosphorus and potassium is used. After the nutrients in the soil are partially depleted by the resin, they are extracted from the resin and measured.

Researchers from ARS and Montana State University developed this new method.

Farm Population Decline Accelerates

The U.S. farm population in 1976 was 600,000 fewer than in 1975, the U.S. Department of Agriculture reports. The farm population now is 8.3 million people, about 15 percent below the 1970 figure.

According to the USDA Economic Research Service report, "Farm Population Estimates for 1976," the number of farm residents appeared to be leveling off in the early 1970's, with an average low 1.2 percent a year rate of decline from 1970 to 1974. But, since 1974, the average annual rate of loss has increased to 5.8 percent.

Even with this recent acceleration, however, the rate of decline over the past 7 years has been only 2.7 percent annually, much lower than the 4.8 percent annual rate from 1960 to 1970.

While the farm population continues to drop, there has been a recent increase in the entire rural population.

The population in nonmetropolitan areas, now growing faster than the metropolitan population, climbed 6.6 percent from 1970 to 1975, compared to the metropolitan growth of 4.1 percent.

The West contradicts the national trend in farm population with its increase of 50,000 farm residents since 1970. All other areas of the country have shown declines in farm population.

The South lost more farm residents than any other area of the United States in 1976, and has lost almost a fourth of its farm residents since 1970. The South, with 2.9 million farm people, ranks second in farm population to the 3.8 million in the North Central States.

About one person out of every 26—3.9 percent of the total U.S. population—lived on a farm in 1976. In 1916, when the number of U.S. farm residents reached its peak, about one person in three lived on a farm.

Wildflower Seed on Market

Seed of the native wildflowers, 'Kaneb' purple prairieclover and 'Nekan' pitcher sage, released by the Soil Conservation Service, are now available commercially. Seed growers in Kansas and Nebraska have produced crops that are ready to go out to seed dealers, nurseries, and garden stores.

'Eureka' thickspike gayfeather seed, also released by SCS, will be available later in 1978 because it takes 2 years to produce a seed crop. SCS provided foundation seed from plantings of the three native forbs to commercial growers in the fall of 1976.

The three plants were selected from trial plots after many years of observation at SCS plant materials centers and then went out to commercial growers for increase and distribution. The selections were made in cooperation with State crop improvement associations, State experiment stations, and the USDA Agricultural Research Service.

'Kaneb,' 'Nekan,' and 'Eureka,' were selected for their abilities to control soil erosion, and to restore and beautify pastureland, rangeland, and roadsides.

Meetings:

January	
3–6	Catfish Farmers of America, Atlanta, Ga.
8–12	American Farm Bureau Federation, Houston, Tex.
8–12	National Council of Farmer Cooperatives, San Francisco, Calif.
9–13	North American Game Breeders and Shooting Preserve Association, San Antonio, Tex.
17–21	National Wool Growers Association, Inc., Denver, Colo.
22–25	National Association of Home Builders, Dallas, Tex.
24–26	National Cattlemen's Association, New Orleans, La.
31–Feb. 2	Southeastern Section of the Society of American Foresters, Birmingham, Ala.
February	
5–9	National Association of Conservation Districts, Anaheim, Calif.
5–10	Society for Range Management, San Antonio, Tex.
17–20	American Association of School Administrators, Atlanta, Ga.
19–22	National Association of Manufacturers, Washington, D.C.
21–22	Southern Forest Institute, Inc., Atlanta, Ga.
26–Mar. 1	Land Improvement Contractors of America, Las Vegas, Nev.
26–Mar. 3	American Society of Photogrammetry, Washington, D.C.
28–Mar. 3	American Camping Association, Anaheim, Calif.
March	
12–16	American Concrete Pipe Association, Atlanta, Ga.
17–19	National Wildlife Federation, Phoenix, Ariz.
19–22	North American Wildlife and Natural Resources, Phoenix, Ariz.

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